

What is claimed:

1. A kit for delivery of a composition into an intraosseous space comprising:

at least one cannula;

at least one stylet insertable into a cannula and being movable therein;

at least one catheter having a high-porosity-tip that are insertable into the cannula; and

a system for delivery of aliquots of said composition into the intraosseous space via said catheter.
2. The kit of claim 1 wherein the catheter is divided into graded markings.
3. The kit of claim 1 wherein said high-porosity tip comprises polylactic acid.
4. The kit of claim 1 wherein said high-porosity tip is partially coated with non-porous or semi-porous material.
5. The kit of claim 4 wherein said material is a ceramic polymer or metal.
6. The kit of claim 5 wherein said material is calcium phosphate, PLLA, or titanium.
7. The kit of claim 4 wherein said material is biocompatible or resorbable.
8. The kit of claim 1 wherein said high porosity tip is biocompatible or resorbable.
9. The kit of claim 1 further comprising a catheter with a plurality of apertures near the distal end.
10. A kit for delivery of a restorative or injectable composition to an intraosseous space or surgically created osseous defect, comprising:

a micro-reamer comprising an expandable cylindrical section in communication with an outer shaft, said outer shaft and expandable section both surrounding an inner shaft, said expandable section comprising leaves that flex when said expandable section is actuated for creating a space for said composition;
at least one cannula for accessing said intraosseous space or defect;

at least one stylet insertable into the cannulae and being movable therein;

at least one catheter that are insertable into the cannulae; and,
a system for delivery of aliquots of said composition into the intraosseous space via said catheter.

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11. The kit of claim 10 wherein said expandable section comprises an elastic metal, a composite material, a polymer, or other substance suitably expandable.
12. The kit of claim 10 wherein the expandable section comprises nitinol.
13. The kit of claim 10 wherein the outer shaft provides the means of expanding said expandable section.
14. The kit of claim 10 wherein the outer shaft is divided into graded markings.
15. The kit of claim 10 wherein said catheter has a distal end and at least one placement orifice disposed proximate to said distal end; said placement orifice being adapted for dispensing said composition radially from the catheter.
16. The kit of claim 10 further comprising a cannulated screw.
17. The kit of claim 10 wherein the stylet, micro-reamer, or cannula, all have a proximate end and distal end and a lateral surface responsive to impact blows is fixed to the proximate end.
18. The kit of claim 10 wherein said catheter comprises stainless steel.
19. The kit of claim 10 wherein said catheter comprises polyimide.
20. The kit of claim 10 wherein said catheter comprises latex.
21. The kit of claim 10 wherein said catheter comprises silicone.
22. The kit of claim 10 wherein said catheter comprises vinyl.
23. The kit of claim 10 wherein said catheter comprises a shape memory material.
24. The kit of claim 10 further comprising one or more syringes having a Luer lock.
25. The kit of claim 10 wherein said cannula is divided into grades, said grades being markings.
26. The kit of claims 10 wherein said micro-reamer is divided into grades, said grades being markings.
27. The kit of claim 10 wherein said catheter is divided into grades, said grades being markings.
28. The kit of claim 10 wherein the said composition comprises a hydrogel.
29. The kit of claim 10 wherein the said composition comprises a synthetic bone void filler.

30. The kit of claim 10 wherein the said composition comprises polymethyl methacrylate.
31. The kit of claim 10 wherein the said composition comprises replicated bone marrow.
32. The kit of claim 10 wherein the said composition comprises replicated bone marrow.
33. A micro-reamer for creating an intraosseous space comprising:
 - an expandable cylindrical section in communication with an outer shaft, said outer shaft and expandable section both surrounding an inner shaft,
 - said expandable section comprising leaves that flex when said expandable section is actuated for creating a space for a restorative or injectable composition;
 - wherein the leaves are situated along the length of the cylindrical section.
34. The micro-reamer of claim 33 wherein said expandable section comprises an elastic metal, a composite material, a polymer, or other substance suitably expandable.
35. The micro-reamer of claim 33 wherein the expandable section comprises nitinol.
36. The micro-reamer of claim 33 wherein the outer shaft provides the means of expanding said expandable section.
37. The micro-reamer of claim 33 wherein the outer shaft is divided into graded markings.
38. A micro-reamer for creating an intraosseous space comprising:
 - an expandable cylindrical section in communication with an outer shaft, said outer shaft and expandable section both surrounding an inner shaft,
 - said expandable section comprising leaves that flex when said expandable section is actuated for creating a space for restorative or injectable composition;
 - wherein the leaves are situated at an angle to the length of the cylindrical section.
39. The micro-reamer of claim 38 wherein the angle is from about 5 degrees to about 30 degrees.
40. The micro-reamer of claim 38 wherein the angle is from about 10 degrees to about 15 degrees.
41. The micro-reamer of claim 40 wherein said expandable section comprises an elastic metal, a composite material, a polymer, or other substance suitably expandable.
42. The micro-reamer of claim 40 wherein the expandable section comprises nitinol.

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43. The micro-reamer of claim 40 wherein the outer shaft provides the means of expanding said expandable section.
44. The micro-reamer of claim 40 wherein the outer shaft is divided into graded markings.
45. A method for delivery of a composition into an intraosseous space comprising:
accessing or creating an osseous defect using a cannula,
creating a space suitable for receipt of a composition using a micro-reamer,
delivering a composition using a system for delivery of aliquots of the restorative composition into the space via a catheter.
46. The method of claim 45 wherein said micro-reamer is an expandable micro-reamer comprising an expandable cylindrical section in communication with an outer shaft, said outer shaft and expandable section both surrounding an inner shaft, and said expandable section comprising leaves that flex when said expandable section is actuated for creating a space for a composition.
47. The method of claim 46 wherein said leaves are situated along the length of the cylindrical section.
48. The method of claim 46 wherein said leaves are situated at an angle to the length of the cylindrical section.
49. The method of claim 46 wherein said expandable micro-reamer comprises an expandable section comprising an elastic metal, a composite material, a polymer, or other substance suitably expandable.
50. The method of claim 46 wherein the expandable section comprises nitinol.
51. The method of claim 46 wherein the outer shaft provides the means of expanding said expandable section.
52. The method of claim 46 wherein the outer shaft is divided into graded markings.
53. The method of claim 48 wherein the angle is from about 5 degrees to about 30 degrees.
54. The method of claim 53 wherein the angle is from about 10 degrees to about 15 degrees.
55. The method of claim 45 wherein said system comprises placing in said osseous defect a first aliquot of restorative composition through a first catheter and then placing in said space a second aliquot of composition through a second catheter.

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45. A method for delivery of a composition into an intraosseous space comprising:
accessing or creating an osseous defect using a cannula,
creating a space suitable for receipt of a composition using a micro-reamer,
delivering a composition using a system for delivery of aliquots of the restorative composition into the space via a catheter.
46. The method of claim 45 wherein said micro-reamer is an expandable micro-reamer comprising an expandable cylindrical section in communication with an outer shaft, said outer shaft and expandable section both surrounding an inner shaft, and said expandable section comprising leaves that flex when said expandable section is actuated for creating a space for a composition.
47. The method of claim 46 wherein said leaves are situated along the length of the cylindrical section.
48. The method of claim 46 wherein said leaves are situated at an angle to the length of the cylindrical section.
49. The method of claim 46 wherein said expandable micro-reamer comprises an expandable section comprising an elastic metal, a composite material, a polymer, or other substance suitably expandable.
50. The method of claim 46 wherein the expandable section comprises nitinol.
51. The method of claim 46 wherein the outer shaft provides the means of expanding said expandable section.
52. The method of claim 46 wherein the outer shaft is divided into graded markings.
53. The method of claim 48 wherein the angle is from about 5 degrees to about 30 degrees.
54. The method of claim 53 wherein the angle is from about 10 degrees to about 15 degrees.
55. The method of claim 45 wherein said system comprises placing in said osseous defect a first aliquot of restorative composition through a first catheter and then placing in said space a second aliquot of composition through a second catheter.